

**YASHWANTRAO CHAVAN MAHARASHTRA OPEN UNIVERSITY, NASHIK**

(Estd. By Government of Maharashtra)

Dnyangangotri, Near Gangapur Dam, Govardhan, Nashik-422 222

Home Assignment

Academic Year - 2024 - 2025

Name of the Programme & Prog. Code	P131 - B.C.A.(with Credits) - Distance Education - 2016 CGPA - T.Y.B.C.A Semester V & P131		
Year / Semester	T.Y.B.C.A / Semester V		
Name of the Course & Course Code	Quantitative Aptitude (CMP332)		
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Permanent Registration Number	2022017000972717		
Regional Centre	Y.C.M.OPEN UNIVERSITY REGIONAL CENTER MUMBAI & 3139A		
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Name of the Study Centre & Code	JNAN VIKAS MANDAL'S MOHANLAL RAICHAND MEHTA COLLEGE OF COMMERCE, DIWALI MAA COLLEGE OF SCIENCE, AMRITLAL RAICHAND MEHTA COLLEGE OF ARTS, DR. R.T. DOSHI COLLEGE OF COMPUTER SCIENCE, AIROLI & 35338		
Date of Submission	20-12-24	No of Pages	8

General Instructions

1	Home assignment is useful for self-analysis of your preparation of the final examination and progress
2	Read all the questions and their marks in the home assignment carefully understand the Definitions and concepts properly
3	Read carefully the text, syllabus and summary related to home assignment.
4	Do not copy the points, matter from the text while writing home assignment mentions your one point /opinions whenever necessary
5	Your answer should include how you would apply the knowledge in real life situations
6	Use A4 size lined papers for writing home assignment by taking printout from this file only
7	Write each new answer on a different page.
8	Printed or typed answers are not allowed
9	The marks of Home assignment and corrective instructions will be sent after checking home assignment
10	Present the Home Assignment by following the instructions and rules. Read carefully all the instructions and rules before any correspondence or communication with the university
11	For each theory course of 4 credits its carry 30 marks, there are Two Home Assignments: i) Home Assignment 01 (HA01) is of Twenty marks consisting of 2 Short Answer Questions carrying 5 marks each and 1 Long Answer Question of 10 marks. ii) Home Assignment 02 (HA02) is of Ten marks consisting of total 10 Objective Type Questions (MCQ) carrying 1 mark each.
12	For each theory course of 2 credits, there is Only One Home Assignment of Fifteen Marks consisting of 1 Short Answer Question of 5 marks and 1 Long Answer Question of 10 marks.
13	Student have to write the Home assignment 02 (MCQ) on separate page. Home Assignment 02 also to be uploaded along with Home assignment 01.


Student Signature

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QNO.

1

a) IF the number $517*324$ is completely divisible by 3, then the smallest whole number in the place of * will be?

Ans: Step 1: Calculate sum of known digits

$$5 + 1 + 7 + 3 + 2 + 4 = 22$$

Step 2: Check divisibility by 3, assuming * be x

If $x = 2$, then $22 + 2 = 24$ is divisible by 3.

\therefore The correct option is (C) 2

b) The total population in a city is 6500. Males and Females increases by 5% and 10% respectively and population becomes 7000. Find number of Males in village.

Ans: Let:

Initial number of Males be M .

Initial number of Females be F .

From the given data,

$$M + F = 6500 \quad (1)$$

Now, after the increase:


The number of males increased by 5% so the new number of males = $M \times 1.05$

The number of females increased by 10%, so the new number of females = $F \times 1.10$

The total population become 7000 after increase.
So,

$$M \times 1.05 + F \times 1.10 = 7000 \quad (2)$$




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Q.NO.

We now have two equations.

From equation (1), we can express F as:

$$F = 6500 - M$$

Substituting into equation (2):

$$\begin{aligned} 1.05M + 1.10(6500 - M) &= 7000 \\ 1.05M + 1.10 \times 6500 - 1.10M &= 7000 \\ 1.05M + 7150 - 1.10M &= 7000 \\ -0.05M + 7150 &= 7000 \\ -0.05M &= 7000 - 7150 \\ -0.05M &= -150 \end{aligned}$$

$$M = \frac{-150}{-0.05} = 3000$$

The number of males in the city is 3000.

\therefore The correct option is (B) 3000



Abhishek
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Q.NO.

2

a) A hall is 15m long and 12m broad, sum of areas of ceiling and Floor is equal to sum of area of four walls. Find Volume of hall

Ans: The formula for the area of the floor and ceiling is:

$$2 \times (l \times b) \\ = 2 \times (15 \times 12) = 360 \text{ m}^2$$

The formula for area of four walls is:

$$2 \times (l+b) \times h$$

From the given problem, the area of floor and ceiling equals to area of four walls:

$$360 = 2 \times (l+b) \times h \\ l+b = 15+12 = 27 \\ \therefore 360 = 2 \times 27 \times h \\ h = \frac{360}{54} \\ = 6 \text{ m}$$

$$\text{Volume} = l \times b \times h \\ = 15 \times 12 \times 6.67 \\ = 1080 \text{ m}^3 \\ = 1200 \text{ m}^3$$

\therefore The volume of the hall is 1200 m^3

\therefore The correct option is c) 1200



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Q.NO.

b) In a Shower, 5cm of rain falls, the volume of water that falls on 1.5 hectares of ground is?

Ans: Given:

Volume = ?

Rainfall height (h) = 5cm = 0.05m

Area (A) = 1.5 hectares = 15000m²

$$\begin{aligned}\text{Volume} &= \text{Area} \times \text{height} \\ &= 15000 \times 0.05 \\ &= 750\text{m}^3\end{aligned}$$

The volume of the water that falls is 750 cubic meters.

∴ The correct option is B) 750cu.M



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Q.NO.

3

a) 39 persons repair a road in 12 days working 5 hours a day. In how many days 30 persons working 6 hours a day take?

Ans: Calculating total work for 39 people:

Given:

39 persons

12 days

5 hours/day

$$\text{Total work} = 39 \times 12 \times 5 = 2340 \text{ person-hours}$$

Calculating days required for 30 people:

Let number of days be x :

$$\text{Work} = 30 \times 6 \times x$$

$$2340 = 30 \times 6 \times x$$

$$x = \frac{2340}{30 \times 6} = \frac{2340}{180} = 13 \text{ days}$$

\therefore It will take 13 days for 30 persons working 6 hours/day to complete the work.

\therefore The correct option is B) 13



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Q.NO.

3

b) 3 pumps working 8 hours a day, can empty a tank in 12 days. How many hours a day must 4 pumps work to empty tank in 1 day?

Ans: Given:

3 pumps,
Working 8 hours/day,
2 days to empty tank

$$\text{Total Work} = 3 \times 8 \times 2 = 48 \text{ pumps-hours}$$

Now, we calculate the hours/day for 4 pumps to empty the tank in 1 day.

Let the required hours/day be x :

$$W = 4 \times x$$

$$48 = 4 \times x$$

$$x = \frac{48}{4}$$

$$= 12$$

\therefore Each of the 4 pumps must work 12 hours a day to empty the tank in 1 day.

\therefore The correct option is D) 12



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Q.NO.

4

9) A trader owes a merchant Rs. 10,028 due 1 year hence. The trader wants to settle the amount after 3 months at 12% interest per annum, how much cash to pay?

Ans: Given:

$$\text{Future Value (FV)} = \text{Rs. } 10,028$$

$$\text{Rate of interest (r)} = 12\% \text{ per annum}$$

$$\text{Time (t)} = 9 \text{ months to 1 year} = \frac{9}{12} = 0.75 \text{ years}$$

$$\text{Present Value (PV)} = \frac{\text{FV}}{1 + (rt)}$$

$$= \frac{10,028}{1 + (0.12 \times 0.75)}$$

$$= \frac{10,028}{1.09}$$

$$\approx 9200$$

\therefore The trader should pay Rs. 9,200 to settle the amount of account after 3 months.

\therefore The correct option is B) 9200



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Q.NO.

b) A man buys a watch for Rs. 1950 in cash, sells it for Rs. 2200 at a credit of 1 year. Find gain or loss if rate of interest is 10% per annum.

Ans: Given:

Future value (FV) = Rs. 2200

Rate of interest = 10% = 0.10

Time (t) = 1 year

$$\text{Present Value (PV)} = \frac{F.V.}{1 + (r \times t)}$$

$$= \frac{2200}{1 + (10 \times 1)}$$

$$= \frac{2200}{1.10}$$

$$= 2000$$

Cost price = Rs. 1950

P.V of selling price = Rs. 2000

Profit = S.P - C.P

$$= 2000 - 1950$$

$$= 50$$

∴ The man made a profit of Rs. 50

∴ The correct option is B) gains Rs. 50

*Abhil*

Student Signature

Important sums

1. Let the present age of the father be $6x$ and present age of son be $1x$

After 5 years their ratio will become $7:2$
So, we can write the equation as:

$$\frac{6x+5}{1x+5} = \frac{7}{2}$$

Now, we cross multiply

$$2(6x+5) = 7(1x+5)$$

$$12x + 10 = 7x + 35$$

$$12x - 7x = 35 - 10$$

$$5x = 25$$

$$x = \frac{25}{5}$$

$$x = 5$$

Now we substitute $x = 5$ in the son's age

$$\text{Son's present Age} = 1x = 1 \times 5 = 5$$

\therefore The present age of the son is 5

$$\frac{1}{96} + \frac{1}{80}$$

We have to make the denominator same to add the fractions.

$$\frac{1}{96} \times 5 = \frac{5}{480}$$

$$\frac{1}{80} \times 6 = \frac{6}{480}$$

$$\text{Combined work rate} = \frac{5}{480} + \frac{6}{480} = \frac{11}{480}$$

If both work together 8 hours a day then:

$$\frac{11}{480} \times 8 = \frac{88}{480} = \frac{11}{54.5}$$

∴ They can complete the work in 5.45 day.

3. Given:

Speed of train = 60 km/hr

Time to cross pole = 9 seconds

We will first convert the speed of train into

$$60 \text{ km/hr} \times \frac{5}{18} = 16.67 \text{ m/s}$$

$$\begin{aligned} \text{length of train} &= \text{Speed} \times \text{Time} \\ &= 16.67 \times 9 \\ &= 150 \end{aligned}$$

∴ The length of train is 150 m

4. Let the total number of apples be x .
He sells 40% of apples, so he has left 60%.

We can set the equation as:

$$0.60x = 420$$

$$x = \frac{420}{0.60}$$

$$= 700$$

\therefore The fruit seller originally had 700 Apples

$$\begin{aligned}
 5. \quad & \text{Total balls} = 7 \\
 & \text{Red balls} = 2 \\
 & \text{Green balls} = 3 \\
 & \text{Blue balls} = 2
 \end{aligned}$$

1. Total ways to draw 2 balls

$${}^nC_r = \frac{n!}{r!(n-r)!} = \frac{7!}{2!(7-2)!} = \frac{5040}{240} = 21$$

2. Total ways to draw 2 balls that are not blue

$${}^nC_r = \frac{n!}{r!(n-r)!} = {}^5C_2 = \frac{5!}{2!(5-2)!} = \frac{120}{12} = 10$$

Let the event that none of the balls picked is blue be $P(E)$

$$P(E) = \frac{n(\text{not blue})}{n(\text{Total ways})} = \frac{10}{21}$$

\therefore The probability that none of the balls picked is blue is $\frac{10}{21}$

Step 4: In 1 hr tank is 20 min full.
How long will the tank take to fill?
We will write these into fractions as:

$$\frac{1}{20} \quad \text{and} \quad \frac{1}{30}$$

We have to make the denominators the same.
Finding the L.C.M

$$\frac{1}{20} \times 3 = \frac{3}{60}$$

$$\frac{1}{30} \times 2 = \frac{2}{60}$$

$$\text{Combined work rate} = \frac{3}{60} + \frac{2}{60} = \frac{5}{60}$$

We will now reverse the fraction:

$$\frac{5}{60} = \frac{60}{5} = 12$$

∴ If both the pipes are opened together, it will take 12 minutes to fill the tank.

Rate of interest (r) =

$$C.I = Rs. 4347$$

$$A = 1 + \frac{r}{100}$$

We now substitute the values in the formula

$$A = \left(1 + \frac{r}{100}\right)^t$$

$$34347 = 30,000 \left(1 + \frac{r}{100}\right)^t$$

$$34347 = 30,000 \times (1.07)^t$$

$$\frac{34347}{30000} = (1.07)^t$$

$$1.1449$$

$$1.1449 = (1.07)^t$$

We have to make L.H.S = R.H.S

1. For $t=1$, $(1.07)^1 = 1.07$

For $t=2$, $(1.07)^2 = 1.1449$

Since $t=2$ matches equation on the L.H.S this is the correct option

∴ The time period is 2 years

2	36
2	18
3	9
3	3
	1

2	84
2	42
3	21
7	3
	1

$$36 = 2 \times 2 \times 3 \times 3$$

$$84 = 2 \times 2 \times 3 \times 7$$

$$\text{Common Multiples} = 2 \times 2 \times 3 = 12$$

\therefore H.C.F of 36 and 84 is 12

1. Let Rajeev's present Age be x years

- Rajeev's Age after 10 years will be $x + 10$
- Rajeev's Age 5 years back will be $x - 5$
- After 15 years, his age will be $x + 15$
his age back

We can set up the equation as.

$$x + 15 = 5(x - 5)$$

$$x + 15 = 5x - 25$$

$$x - 5x = -25 - 15$$

$$4x = 40$$

$$x = \frac{40}{4}$$

$$x = 10$$

∴ Rajeev's present Age is 10 years

10. By taking $\star = 1$:
5171324 is not divisible by 3

By taking $\star = 2$:
5172324 is divisible by 3

\therefore The number in place of the \star will be 2

$$\begin{aligned} \text{C.I.} &= \text{P.O.S.} \\ \text{C.I.} &= \text{P.O.S.} \end{aligned}$$

$$\begin{aligned} \text{Loss} &= \text{C.P.} - \text{S.P.} \\ &= 500 - 400 \\ &= 100 \end{aligned}$$

$$\text{Loss percentage} = \frac{\text{Loss}}{\text{C.P.}} \times 100$$

$$= \frac{100}{500} \times 100$$

$$= 20$$

$$\therefore \text{Loss percentage} = 20\%$$

$$A = P \left(1 + \frac{R}{100} \right)^t$$

$$12600 \left(1 + \frac{10}{100} \right)^2$$

$$= 15246$$

$$\begin{aligned} \text{C.I.} &= A - P \\ &= 2646 \end{aligned}$$

1) Jyoti's Investment = Rs. 25,500

Deepak's Investment = Rs. 35,000

$$\text{Ratio} = \frac{25500}{35000} = \frac{3}{4}$$

Their profit will also be divided in the same 3:4 ratio

$$\text{Deepak's share} = \frac{4}{3+4} \times 13800$$

$$= 8400$$

∴ Deepak's share is Rs. 8400

3. Let the three numbers be $3x, 4x$ and $5x$.
The sum of their squares is 1250.

∴ We can write the equation as:

$$\begin{aligned} & (3x)^2 + (4x)^2 + (5x)^2 = 1250 \\ & = 9x^2 + 16x^2 + 25x^2 = 1250 \\ & = 50x^2 = 1250 \end{aligned}$$

$$x^2 = \frac{1250}{50}$$

$$50$$

$$x^2 = 25$$

$$x = \sqrt{25}$$

$$x = 5$$

Now, the numbers are:

$$3 \times 5 = 15$$

$$4 \times 5 = 20$$

$$5 \times 5 = 25$$

The sum of the numbers is:

$$15 + 20 + 25 = 60$$

14. Simple Interest (S.I) = $\frac{P \times R \times T}{100}$

Where:

(P) Principal = Principal Amount

Rate (R) = Rate of Interest

Time (T) = Total time money is invested

15. Find:

$$A = \text{Rs. } 1348.32$$

$$P = \text{Rs. } 1200$$

$$T = 2 \text{ years}$$

$$C.I = A = P \left(1 + \frac{x}{100} \right)^T$$

$$1348.32 = 1200 \left(1 + \frac{x}{100} \right)^2$$

$$\frac{1348.32}{1200} = \left(1 + \frac{x}{100} \right)^2$$

$$\sqrt{1.124} = 1 + \frac{x}{100} \quad (\text{Taking Square root on both sides})$$

$$1.06 = 1 + \frac{x}{100}$$

$$1.06 - 1 = \frac{x}{100}$$

$$0.06 = \frac{x}{100}$$

$$x = 0.06 \times 100$$
$$= 6$$

\therefore Rate of C.I is 6

16

Given:

$$P = 12600$$

$$T = 2 \text{ years}$$

$$R = 10\%$$

By using the formula of C.I.:

$$A = P \left(1 + \frac{R}{100} \right)^T$$

$$= 12600 \left(1 + \frac{10}{100} \right)^2$$

$$= 12600 \times 1.21$$

$$A = 15246$$

$$C.I. = A - P$$

$$= 15246 - 12600$$

$$= 2646$$

$$\therefore C.I. = \text{Rs. } 2646$$

17. A can finish work in 18 days
So A's work rate = $\frac{1}{18}$

B can finish same work in 9 days
So B's work rate = $\frac{1}{9}$

Make denominators common by taking L.C.M

$$\frac{1}{18} \times \frac{1}{1} = \frac{1}{18}$$

$$\frac{1}{9} \times \frac{2}{2} = \frac{2}{18}$$

$$\text{Combined work rate} = \frac{1}{18} + \frac{2}{18} = \frac{3}{18} = \frac{1}{6}$$

\therefore A and B can finish $\frac{1}{6}$ of the work
if they do it together

1. A does work in 10 days
his work rate = $\frac{1}{10}$

2. B does work in 15 days
his work rate = $\frac{1}{15}$

$$\text{Combined work rate} = \frac{1}{10} + \frac{1}{15}$$

To add these fractions, we have to make the denominators common.

$$\frac{1}{10} \times 3 = \frac{3}{30} \qquad \frac{1}{15} \times 2 = \frac{2}{30}$$

$$\frac{3}{30} + \frac{2}{30} = \frac{5}{30} = \frac{1}{6}$$

∴ A and B together will finish the work in 6 days.

10) A can fill the tank in 36 hours

$$A's \text{ rate of work} = \frac{1}{36}$$

B can fill the tank in 45 hours

$$B's \text{ work rate} = \frac{1}{45}$$

$$\text{Combined work rate} = \frac{1}{36} + \frac{1}{45}$$

To add these fractions, expose them to a common denominator

$$\frac{1}{36} \times \frac{5}{5} = \frac{5}{180}$$

$$\frac{1}{45} \times \frac{4}{4} = \frac{4}{180}$$

$$\frac{5}{180} + \frac{4}{180} = \frac{9}{180} = \frac{1}{20}$$

\therefore It will take 20 hours to fill tank

A and B can finish work in 12 days
 B and C can finish work in 15 days
 A and C can finish work in 20 days

Let the work rate for A be $\frac{1}{12}$
 Let the work rate for B be $\frac{1}{x}$
 Let the work rate for C be $\frac{1}{y}$

From these statements we can form the
 Equation as:

$$\frac{1}{12} + \frac{1}{x} = \frac{1}{4}$$

Now solve for x

$$\frac{1}{x} = \frac{1}{4} - \frac{1}{12}$$

Make denominators common

$$\frac{1}{4} \times 3 = \frac{3}{12} \quad \frac{-1}{12} \times 1 = \frac{-1}{12}$$

$$\frac{3}{12} - \frac{1}{12} = \frac{2}{12} = \frac{1}{6}$$

∴ B can finish work in 6 days alone

21. Pipe A can fill the tank in 5 hours.
Pipe A's rate of work = $\frac{1}{5}$

Pipe B's rate of work = $\frac{1}{10}$

Pipe C's rate of work = $\frac{1}{30}$

$$\text{Combined work rate} = \frac{1}{5} + \frac{1}{10} + \frac{1}{30}$$

Make denominators common to add fractions

$$\frac{1}{5} \times 6 = \frac{6}{30}, \quad \frac{1}{10} \times 3 = \frac{3}{30}, \quad \frac{1}{30} \times 1 = \frac{1}{30}$$

$$\frac{6}{30} + \frac{3}{30} + \frac{1}{30} = \frac{10}{30} = \frac{1}{3}$$

\therefore It will take 3 hours to fill tank

Q2 We will first find the cost of a single toy,

$$\frac{234}{15} = 15.6$$

The cost of 1 toy is Rs. 15.6

Now we multiply it by 35 to find the cost.

$$35 \times 15.6 = 546$$

\therefore Cost of 35 toys is Rs. 546

... respectively.

...

...

$$L_1 = S_1 \times 28$$

$$L_2 = S_2 \times 18$$

The trains cross each other in ...
their combined length is:

$$L_1 + L_2 = (S_1 + S_2) \times 26$$

Now we substitute all the expressions

$$S_1 \times 28 + S_2 \times 18 = (S_1 + S_2) \times 26$$

$$28S_1 + 18S_2 = 26S_1 + 26S_2$$

$$28S_1 - 26S_1 = 26S_2 - 18S_2$$

$$2S_1 = 8S_2$$

$$\frac{S_1}{S_2} = \frac{8}{2}$$

$$\frac{S_1}{S_2} = \frac{4}{1}$$

$$= 4 = 1:4$$

$$4$$

∴ The ratio of their speed is 1:4

$$S = \{H, T\} \quad E = \{HH\}$$

$$P(E) = \frac{n(E)}{n(S)} = \frac{1}{2}$$

∴ The probability is $\frac{1}{2}$ of getting heads

13 km/hr

25

Speed of Samir is still water

Speed of Stream

Total speed = 13 km/hr + 4 km/hr = 17 km/hr

And the time to cover 68 km is:

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{68}{17} = 4$$

∴ The person will take 4 hours

Q. In the following sample space
S = {HH, HT, TH, TT} find the probability

$$P(E) = \frac{n(E)}{n(S)}$$
$$= \frac{3}{4}$$

∴ The probability is $\frac{3}{4}$

27. Let speed of boat be B km/hr and stream be S km/hr

When boat is moving in the direction of the stream:

$$B + S = 13 \quad (1)$$

When boat is moving against the direction of the stream:

$$B - S = 7 \quad (2)$$

Now we add the two eqns

$$(B + S) + (B - S) = 13 + 7$$

$$2B = 20$$

$$B = \frac{20}{2}$$

$$B = 10$$

\therefore speed of boat in still water = 10 km/hr

28. We will first find the most frequently repeated letters:

A: Repeated 4 times

L: Repeated 2 times

$$\text{Permutations} = \frac{10!}{p_1! \times p_2!}$$

$$= \frac{10!}{4! \times 2!}$$

$$= 7560$$

∴ 7560 permutations are possible

29. Let present Age of daughter be x years

Since father is twice as old as daughter, his current age is $2x$

1. 20 years ago the father's age was $2x - 20$ and daughter was $x - 20$

According to problem, 20 years ago father's age was 10 times the daughter's age

$$2x - 20 = 10(x - 20)$$

$$= 2x - 20 = 10x - 200$$

$$= 2x - 10x = -200 + 20$$

$$-8x = -180$$

$$x = \frac{-180}{-8}$$

$$x = 22.5$$

Now we find Present Age of Father

$$2x = 2 \times 22.5 = 45$$

\therefore Present Age of father = 45 yrs.

3 2. Number of ways to draw two ~~blue~~ balls that are not blue:

$${}^nC_2 = \frac{n!}{2!(n-2)!} = \frac{5!}{2!(5-2)!} = 10$$

Let the probability that none of the two balls picked is blue be $P(E)$

$$P(E) = \frac{n(\text{Non-blue ways})}{n(\text{Total ways})} = \frac{10}{21}$$

\therefore The probability that none of the balls drawn is blue is $\frac{10}{21}$

33. Total Cards = 52

Total face cards = 12

$$P(E) = \frac{n(E)}{n(S)} = \frac{12}{52} = \frac{3}{13}$$

∴ The probability of drawing a face card
is $\frac{3}{13}$.